

Claims

- [c1] A method for producing a lightweight starting stock for gun frames and gun components comprising:
- mixing alloying elements into aluminum to provide a density of <0.106 pounds per cubic inch,
 - casting a billet,
 - optionally, extruding said billet into starting stock,
 - forging the billet or starting stock into a gun frame or gun component wherein secondary machining may be performed to achieve final dimensions, or alternatively, machining the starting stock into a gun frame or gun component,
 - solution heat treating said component
 - quenching said gun component and
 - artificial aging said gun component
 - wherein said gun component has a yield strength of >90 ksi.
- [c2] The method of claim 1 wherein said gun frame or gun component has a yield strength of >80 ksi.
- [c3] The method of claim 1 wherein said gun frame or gun component has a yield strength of >70 ksi.
- [c4] The method of claim 1 wherein the solution heat treatment, quench and artificial aging is performed to the billet or extruded starting stock, and said starting stock is then machined into a gun frame or gun component, wherein said gun component has a yield strength of >90 ksi.
- [c5] The method of claim 1 wherein the solution heat treatment, quench and artificial aging is performed to the billet or extruded starting stock, and said starting stock is then machined into a gun frame or gun component, wherein said gun component has a yield strength of >80 ksi.
- [c6] The method of claim 1 wherein the solution heat treatment, quench and artificial aging is performed to the billet or extruded starting stock, and said

starting stock is then machined into a gun frame or gun component, wherein said gun component has a yield strength of >70 ksi.

[c7] The method of claim 1 wherein the billet is fabricated via powder metallurgy or spray cast methods as opposed to conventional casting techniques.

[c8] A method for producing a lightweight starting stock for gun frames and gun components comprising:

- mixing alloying elements into aluminum with the alloy composition containing 6.2 9.0 wt% Zn, 1.0 3.0 wt% Mg, 0 2.5 wt% Cu, and 0.02 to 0.50 wt% of at least one grain refining element selected from a group consisting of Zr, Sc, Cr, Mn, Ti and Hf, and casting said elements into a billet,
- optionally, extruding said billet into starting stock,
- forging the billet or starting stock into a gun frame or gun component wherein secondary machining may be performed to achieve final dimensions, or alternatively, machining the starting stock into a gun frame or gun component, ,
- solution heat treating said component
- quenching said gun component and
- artificial aging said gun component

wherein said gun component has a yield strength of >90 ksi.

[c9] The method of claim 8 wherein said gun frame or gun component has a yield strength of >80 ksi.

[c10] The method of claim 8 wherein said gun frame or gun component has a yield strength of >70 ksi.

[c11] The method of claim 8 wherein the solution heat treatment, quench and artificial aging is performed to the billet or extruded starting stock, and said starting stock is then machined into a gun frame or gun component, wherein said gun component has a yield strength of >90 ksi.

[c12] The method of claim 8 wherein the solution heat treatment, quench and

artificial aging is performed to the billet or extruded starting stock, and said starting stock is then machined into a gun frame or gun component, wherein said gun component has a yield strength of >80 ksi.

[c13] The method of claim 8 wherein the solution heat treatment, quench and artificial aging is performed to the billet or extruded starting stock, and said starting stock is then machined into a gun frame or gun component, wherein said gun component has a yield strength of >70 ksi.

[c14] The method of claim 8 wherein the billet is fabricated via powder metallurgy or spray cast methods as opposed to conventional casting techniques.

[c15] A method for producing a lightweight starting stock for gun frames and gun components comprising:

mixing alloying elements into aluminum using the alloy families: Al-

Zn-Mg-Cu, Al-Zn-Mg, Al-Cu-Li, Al-Si-Mg or Al-Cu-Mg

wherein said alloy families are cast into a billet

optionally, extruding said billet into starting stock,

forging the billet or starting stock into a gun frame or gun component

wherein secondary machining may be performed to achieve final

dimensions, or alternatively, machining the starting stock into a gun

frame or gun component, ,

solution heat treating said component

quenching said gun component and

artificial aging said gun component

wherein said gun component has a yield strength of >70 ksi.

[c16] The method of claim 15 wherein said gun frame or gun component has a yield strength of >80 ksi.

[c17] The method of claim 15 wherein said gun frame or gun component has a yield strength of >80 ksi.

[c18] The method of claim 15 wherein the solution heat treatment, quench

